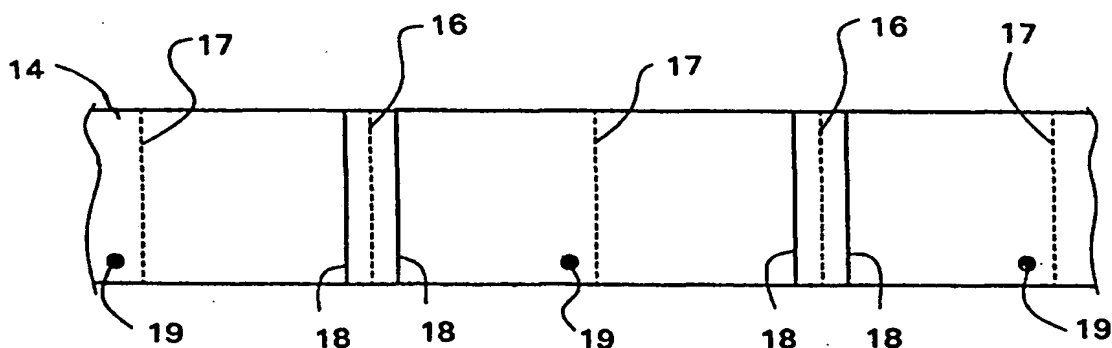




## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<b>(21) International Application Number:</b> PCT/US00/01304 <b>(22) International Filing Date:</b> 18 January 2000 (18.01.00) <b>(30) Priority Data:</b> 1011096 20 January 1999 (20.01.99) NL <b>(71) Applicants (for all designated States except US):</b> CASE PACK- ING SALES EUROPE B.V. [NL/NL]; Industrieweg 24, NL-6039 AP Stramproy (NL). FREE-FLOW PACKAGING INTERNATIONAL, INC. [US/US]; 1090 Mills Way, Red- wood City, CA 94063-3120 (US). <b>(72) Inventor; and</b> <b>(75) Inventor/Applicant (for US only):</b> AQUARIUS, Pieter, Theodorus, Joseph [NL/NL]; Wilhelmina Straat 12, NL-6039 AC Strampoy (NL). <b>(74) Agents:</b> WRIGHT, Edward, S. et al.; Flehr Hohbach Test Albritton & Herbert LLP, Suite 3400, 4 Embarcadero Center, San Francisco, CA 94111-4187 (US).		<b>(81) Designated States:</b> AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).  <b>Published</b> <i>With international search report.</i>

**(54) Title:** PLASTIC FILM AND METHOD FOR MAKING PNEUMATICALLY FILLED PACKING CUSHIONS



**(57) Abstract**

Plastic film material (14) and method for the manufacture of pneumatically inflated packing cushions, wherein transverse rows of perforations (16, 17) are formed across two elongated, superposed layers of plastic film material, the layers are sealed together along lines (18) defining a plurality of cushions separated by the perforations, and the material is then formed and rolled for shipment and storage. At the time and place the cushions are to be used, the material is unwound from the roll and fed to a relatively simple machine where air or other suitable gas is injected between the two layers, and the material is sealed to complete the cushions. In some embodiments, the film material is in the form of a flattened tube, and in other it is the centerfold material in which the film is folded along its centerline.

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### **PLASTIC FILM AND METHOD FOR MAKING PNEUMATICALLY FILLED PACKING CUSHIONS**

This invention pertains generally to packing materials and, more particularly, to a processed plastic film material and method for the manufacture of pneumatically filled packing cushions.

5 Air-filled packing cushions are used to fill up empty spaces in packing containers and to provide protection for fragile goods. These cushions are usually manufactured by feeding an unprocessed length of plastic film material from a storage roll to a machine that processes it by sealing two layers of the material together along lines which define the cushions, injecting air between the layers to inflate the cushions, and perforating the  
10 material between the cushions. Such machines are complex and also require time-intensive maintenance.

It is in general an object of the invention to provide a new and improved roll of processed plastic film material and method for the manufacture of pneumatically filled packing cushions.

15 Another object of the invention is to provide a roll of processed plastic film material and method of the above character from which pneumatically filled packing cushions can be manufactured with a simple machine.

These and other objects are achieved in accordance with the invention by providing a plastic film material and method for the manufacture of  
20 pneumatically inflated packing cushions wherein transverse rows of

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perforations are formed across two elongated, superposed layers of plastic film material, the layers are sealed together along lines defining a plurality of cushions separated by the perforations, and the material is then formed the film material into a roll for shipment and storage. At the time and place the cushions are to be used, the material is unwound from the roll and fed to a relatively simple machine where air or other suitable gas is injected between the two layers, and the material is sealed to complete the cushions. In some embodiments, the film material is in the form of a flattened tube, and in others it is a centerfold material in which the film is folded along its centerline. In some embodiments, a marker is placed on the film for use in positioning the film in the machine which injects the air and seals the film to form the cushions.

Figure 1 is an isometric of one embodiment of a roll of processed plastic film material incorporating the invention for use in the manufacture of pneumatically filled packing cushions.

Figure 2 is a fragmentary top plan view of one embodiment of a processed plastic film material incorporating the invention for use in the manufacture of pneumatically filled packing cushions.

Figure 3 is a transverse sectional view of the embodiment of Figure 2.

Figure 4 is a fragmentary top plan view of another embodiment of a processed plastic film material incorporating the invention for use in the manufacture of pneumatically filled packing cushions.

Figure 5 is a transverse sectional view of the embodiment of Figure 4.

As illustrated in Figure 1, an elongated length of plastic film material 11 is wound about a central shaft or core 12 to form a roll 13 for use in the manufacture of pneumatically inflated packing cushions. Although the shaft is shown as having a circular cross section, it can have any other

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suitable shape, such as a polygon. The film material is fed from the roll to a machine that further processes it and fills it with air or other suitable gas to form the packing cushions.

5 In the embodiment illustrated in Figure 2, the film material is in the form of a flattened tubular film 14 which is provided with transverse rows of perforations 16, 17 that are spaced at regular intervals along the length of the tubing. Each of the rows of perforations extends over the entire width of the tubular film.

10 The film is sealed together along lines 18 on opposite sides of every other one of the rows of perforations, *i.e.* next to rows 16. These seal lines are formed close to the perforations and extend across the entire width of the film to seal off the perforations in rows 16 from the rest of the material.

15 Markers 19 are provided near the intermediate rows of perforations 17, *i.e.* the rows which do not have the seal lines next to them. These markers can be detected optically, magnetically or by other suitable means, and can be utilized to indicate the position of the tubular film and the rows of perforations in the machine which makes the cushions.

20 After the film material has been processed by forming the perforations, seal lines and markers, it is formed into the rolls 13 for shipment and storage. To complete the cushions, the material is fed from a roll into a machine (not shown) which introduces air or other suitable gas into the tubing through perforations 17, then forms transverse seal lines similar to seal lines 18 next to the perforations to prevent the air from leaking out. Since the perforations are preformed, the machine does not have to make them, 25 and the inflation and sealing can be done with a relatively simple, inexpensive machine.

Alternatively, the material can be prepared with seal lines 18 on both sides of all of the rows of perforations, in which case the air or other gas can be introduced into the cushions through a hollow needle punched through a wall of the film. After the air or gas has been injected, the needle is withdrawn, and the hole formed by the needle is closed by heat sealing.

In the embodiment of Figure 4, the film material is a type sometimes referred to as a centerfold film 21. It consists of an elongated sheet of film material which is folded along its centerline with one closed edge 22 and one open edge 23. As in the embodiment of Figure 2, transverse rows of perforations 24 are formed at regular intervals along the length of the material. Each of these rows extends across the entire width of the folded material.

The folded material is sealed together along lines 26 on either side of each of the rows of perforations. These seal lines are formed close to the perforations, and extend from the closed edge 22 of the material to within a short distance from the open edge 23.

If desired, markers (not shown) similar to markers 19 in the embodiment of Figure 2 can be provided for use in aligning the film material in the machine which makes it into cushions.

As in the embodiment of Figure 2, the processed material is formed into rolls 13 for shipment and storage. To complete the cushions, the material is fed from a roll into a machine (not shown) which introduces air or other suitable gas through the open edge 23 and between the two layers of the folded film. The machine then seals the two layers together along a longitudinally extending line 28 which intersects the transverse seal lines 26 near the open edge of the film to contain the air or other gas and complete the cushions. Here again, since the perforations are preformed, all the machine needs to do is to inject the air and form the longitudinal

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seal. That can be done with a relatively uncomplicated, inexpensive machine.

5 It is apparent from the foregoing that a new and improved roll of processed plastic film material and method have been provided for the manufacture of pneumatically inflated packing cushions. While only certain presently preferred embodiments have been described in detail, as will be apparent to those familiar with the art, certain changes and modifications can be made without departing from the scope of the invention as defined by the following claims.

**CLAIMS**

1. A plastic film material for use in the manufacture of pneumatically inflated packing cushions, comprising two longitudinally extending superposed layers of film material joined together along at least one edge, transverse rows of perforations extending across the superposed layers, and seams sealing the two layers together along transverse lines on opposite sides of and in close proximity to the rows of perforations.
2. The plastic film material of Claim 1 wherein the seams extend across the entire width of the film material.
3. The plastic film material of Claim 1 wherein the seams extend from one edge of the film material to within a short distance from the other edge of the material.
4. The plastic film material of Claim 1 further including a marker on the film material for use in positioning the material in a machine which processes the material to make the cushions.
5. The plastic film material of Claim 1 wherein both edges of the material are closed.
6. The plastic film material of Claim 1 wherein one edge of the material is open.
7. A plastic film material for use in the manufacture of pneumatically inflated packing cushions, comprising two longitudinally extending superposed layers of film material joined together along at least one edge, transverse rows of perforations extending across the superposed layers, and seams sealing the two layers together along transverse lines on



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opposite sides of and in close proximity to every other one of the rows of perforations.

8. The plastic film material of Claim 7 wherein the seams extend across the entire width of the film material.

9. The plastic film material of Claim 1 wherein the seams extend from one edge of the film material to within a short distance from the other edge of the material.

10. The plastic film material of Claim 7 further including a marker on the film material for use in positioning the material in a machine which processes the material to make the cushions.

11. The plastic film material of Claim 7 wherein both edges of the material are closed.

12. The plastic film material of Claim 7 wherein one edge of the material is open.

13. A plastic film material for use in the manufacture of pneumatically inflated packing cushions, comprising an elongated length of tubular film which is flattened and formed into a roll, transverse rows of perforations extending across the film at periodic intervals along the length of the film, and seams sealing the film together along transverse lines on opposite sides of and in close proximity to every other one of the rows of perforations.

14. The plastic film material of Claim 13 wherein the seams extend across the entire width of the flattened film.

15. The plastic film material of Claim 13 further including a marker on the film material for use in positioning the material in a machine which processes the material to make the cushions.

5 16. A plastic film material for use in the manufacture of pneumatically inflated packing cushions, comprising an elongated length of film which is which is folded over along its centerline to form superposed two layers having one closed edge and one open edge, transverse rows of perforations extending across the film at periodic intervals along the length of the film, and seams sealing the film together along transverse lines on opposite sides of and in close proximity to the rows of perforations.

17. The plastic film material of Claim 16 wherein the seams extend from the closed edge to within a short distance of the open edge of the film.

18. The plastic film material of Claim 16 further including a marker on the film material for use in positioning the material in a machine which processes the material to make the cushions.

5 19. In a method of manufacturing pneumatically inflated packing cushions, the steps of: forming transverse rows of perforations across two elongated, superposed layers of plastic film material, sealing the layers together along lines defining a plurality of cushions separated by the perforations, forming the film material into a roll for shipment and storage, and thereafter feeding the material from the roll to a machine which injects a gas between the two layers and seals the material to complete the cushions.

20. The method of Claim 19 wherein the layers are sealed together along lines on either side of and in close proximity to every other one of the rows of perforations.

21. The method of Claim 20 wherein the gas is injected through the perforations which do not have the seals on either side of them.

22. The method of Claim 23 wherein the machine seals the material along transverse lines on either side of the rows of perforations through which the gas is injected.

23. The method of Claim 19 wherein the layers are joined together along one edge and open along one edge, the layers are sealed together along transverse lines on either side of and in close proximity to the rows of perforations, and the gas is injected through the open edge.

24. The method of Claim 23 wherein the machine seals the material along a longitudinally extending line which intersects the transverse seal lines.



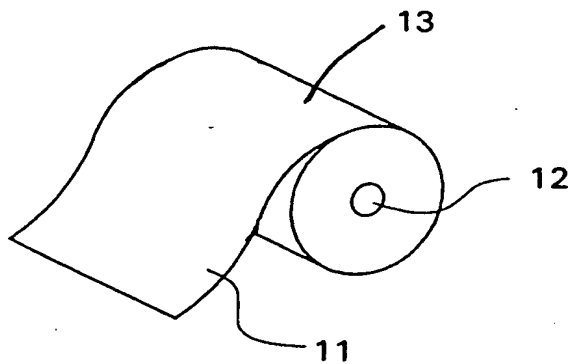


FIG. 1

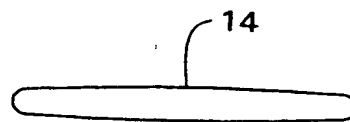


FIG. 3

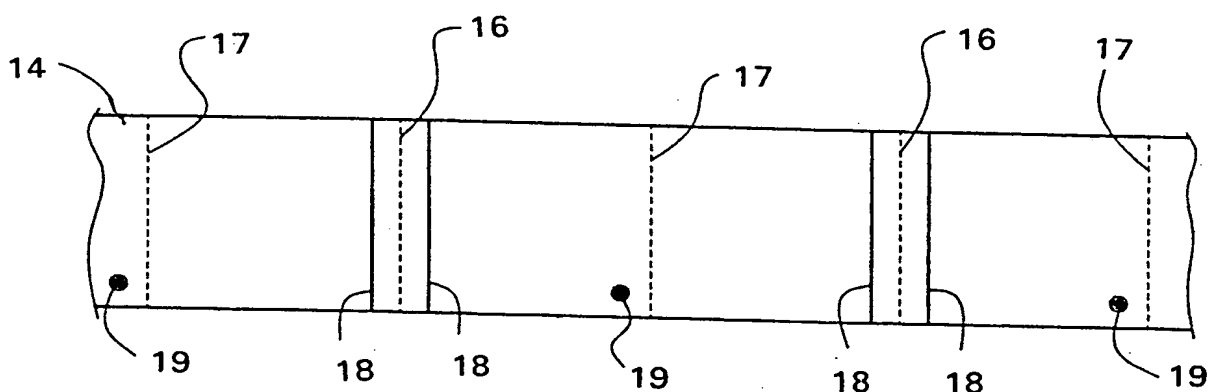


FIG. 2

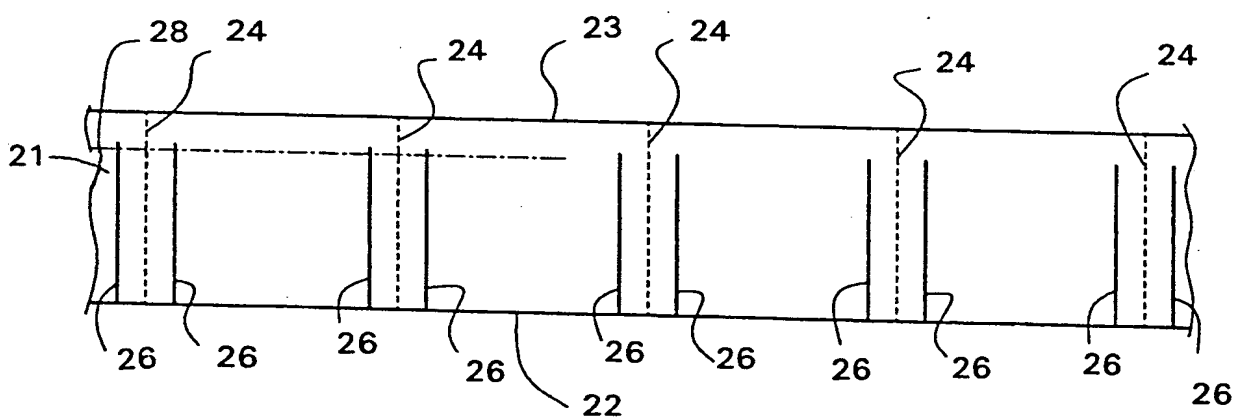


FIG. 4

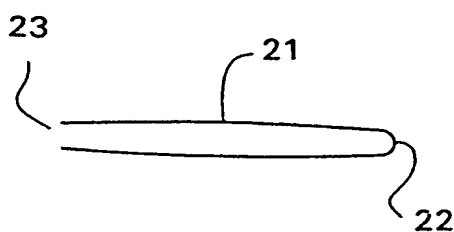


FIG. 5



# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US00/01304

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : B32B 03/02; B65D 65/28

US CL : 156/159, 304.1; 428/43, 57, 58, 121

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

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U.S. : 156/159, 304.1; 428/43, 57, 58, 121

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
NONE

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
NONE

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5,658,632 A (KRABILL) 19 August 1997, see entire document.	1-24
A	US 5,604,016 A (ALLEGRE) 18 February 1997, see entire document.	1-24
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